## **AMENDMENTS TO THE CLAIMS**

Please amend the claims as follows.

Claim 1 (original): A pharmaceutical formulation comprising one or more excipients and  $3\alpha$ , $16\alpha$ , $17\beta$ -trihydroxy- $5\alpha$ -androstane,  $3\alpha$ , $16\alpha$ -dihydroxy-17-oxo- $5\alpha$ -androstane,  $3\beta$ , $16\alpha$ , $17\beta$ -trihydroxy- $5\alpha$ -androstane,  $3\beta$ , $16\alpha$ -dihydroxy-17-oxo- $5\alpha$ -androstane,  $3\alpha$ , $16\beta$ -dihydroxy-17-oxo- $5\alpha$ -androstane,  $3\alpha$ , $16\beta$ -dihydroxy-17-oxo-17-

Claim 2 (original): The pharmaceutical formulation of claim 1 wherein the compound is  $3\alpha,16\alpha,17\beta$ -trihydroxy- $5\alpha$ -androstane.

Claim 3 (original): The pharmaceutical formulation of claim 1 wherein the compound is  $3\alpha$ ,  $16\alpha$ -dihydroxy-17-oxo- $5\alpha$ -androstane.

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Claim 4 (original): A pharmaceutical formulation for buccal or sublingual administration comprising one or more excipients and a compound wherein the compound is  $16\alpha$ -fluoro-17-oxoandrost-5-ene,  $3\alpha$ -hydroxy- $16\alpha$ -fluoro-17-oxoandrost-5-ene,  $3\beta$ -hydroxy- $16\alpha$ -fluoro-17-oxoandrost-5-ene,  $7\beta$ -hydroxy- $16\alpha$ -fluoro-17-oxoandrost-5-ene,  $16\alpha$ -fluoro-7,17-dioxoandrost-5-ene.

Claim 5 (original): The pharmaceutical formulation of claim 4 wherein the compound is micronized.

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Claim 6 (original): The pharmaceutical formulation of claim 4 wherein the compound is  $16\alpha$ -fluoro-17-oxoandrost-5-ene.

Claim 7 (original): A pharmaceutical formulation comprising one or more excipients and two or more of  $3\beta$ -hydroxy- $16\alpha$ -bromo-17-oxo- $5\alpha$ -androstane,  $3\beta$ -hydroxy- $16\beta$ -bromo-17-oxo- $5\alpha$ -androstane and  $3\beta$ -hydroxy- $16\alpha$ -bromo-17-oxo- $5\alpha$ -androstane hemihydrate.

Claim 8 (original): The pharmaceutical formulation of claim 7 wherein the pharmaceutical formulation is for oral, buccal, sublingual or aerosol administration.

Claim 9 (original): The pharmaceutical formulation of claim 7 comprising 7  $3\beta$ -hydroxy- $16\beta$ -bromo-17-oxo- $5\alpha$ -androstane and  $3\beta$ -hydroxy- $16\alpha$ -bromo-17-oxo- $5\alpha$ -androstane hemihydrate.

Claim 10 (original): The pharmaceutical formulation of claim 9 wherein the pharmaceutical formulation is for oral, buccal, sublingual or aerosol administration.

Claims 11-22 (canceled)

Claim 23 (new): A method to treat or prevent osteoporosis or a bone fracture in a subject in need thereof, comprising administering to the subject an effective amount of a compound having the structure

$$R^{1}$$
  $R^{2}$   $R^{2}$  or

wherein.

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R<sup>1</sup> is -OR<sup>PR</sup>, -SR<sup>PR</sup>, -N(R<sup>PR</sup>)<sub>2</sub>, -N<sub>3</sub>, -NO<sub>2</sub>, an ester, a thioester, a phosphoester, a phosphothioester, a sulfate ester, an amino acid, a peptide, an ether, a thioether, a carbonate, a carbamate, an optionally substituted monosaccharide or an optionally substituted oligosaccharide;

R<sup>2</sup> and R<sup>3</sup> independently are -H, -OR<sup>PR</sup>, =O, -SR<sup>PR</sup>, =S, -N(R<sup>PR</sup>)<sub>2</sub>, -N<sub>3</sub>, =NOH, -CN, -NO<sub>2</sub>, an amino acid, a peptide, an ether, a thioether, an acyl group, a thioacyl group, a carbonate, a carbamate, a thioacetal, a halogen, an optionally substituted alkyl group, an optionally substituted alkynyl group;

R<sup>4</sup> is -OR<sup>PR</sup>, =O, -SR<sup>PR</sup>, =S, -N(R<sup>PR</sup>)<sub>2</sub>, -N<sub>3</sub>, =NOH, -NO<sub>2</sub>, an ester, a thioester, a phosphoester, a phosphonoester, a phosphonoester, a phosphiniester, a sulfate ester, an amino acid, a peptide, an ether, a thioether, an optionally substituted heteroaryl moiety, an optionally substituted monosaccharide or an optionally substituted oligosaccharide;

R<sup>6</sup> is -H or optionally substituted alkyl;

R<sup>9</sup> is -CHR<sup>10</sup>-, -O-, -S-, -NR<sup>PR</sup>-, or R<sup>9</sup> is absent, leaving a 5-membered ring, wherein R<sup>10</sup> is -OH, -SH, halogen or optionally substituted alkyl;

R<sup>13</sup> independently is C<sub>1-6</sub> alkyl;

RPR independently are -H or a protecting group.

Claim 24 (new): The method of claim 23 wherein the compound has the structure

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$$R^{1}$$
 $R^{1}$ 
 $R^{1}$ 
 $R^{2}$ 
 $R^{4}$ 
 $R^{3}$ 
 $R^{4}$ 
 $R^{5}$ 
 $R^{5}$ 
 $R^{6}$ 
 $R^{6}$ 
 $R^{1}$ 
 $R^{1}$ 
 $R^{2}$ 
 $R^{3}$ 

Claim 25 (new): The method of claim 24 wherein

(1) R<sup>1</sup> and R<sup>4</sup> are -OH, R<sup>2</sup> and R<sup>3</sup> are -H and R<sup>9</sup> is -CH<sub>2</sub>- or -CH=;

(2) R<sup>1</sup> and R<sup>4</sup> are -OH, R<sup>2</sup> is -H, R<sup>3</sup> is -Br and R<sup>9</sup> is -CH<sub>2</sub>- or -CH=;

(3) R<sup>1</sup> and R<sup>4</sup> are -OH, R<sup>2</sup> is -H, R<sup>3</sup> is -F and R<sup>9</sup> is -CH<sub>2</sub>- or -CH=;

(4)  $R^1$ ,  $R^2$  and  $R^4$  are -OH,  $R^3$  is -H and  $R^9$  is -CH<sub>2</sub>- or -CH=;

(5) R<sup>1</sup>, R<sup>2</sup> and R<sup>4</sup> are -OH, R<sup>3</sup> is -Br and R<sup>9</sup> is -CH<sub>2</sub>- or -CH=;

(6) R<sup>1</sup>, R<sup>2</sup> and R<sup>4</sup> are -OH, R<sup>3</sup> is -F and R<sup>9</sup> is -CH<sub>2</sub>- or -CH=;

(7)  $R^1$ ,  $R^3$  and  $R^4$  are -OH,  $R^2$  is -H and  $R^9$  is -CH<sub>2</sub>- or -CH=;

(8)  $R^1$ ,  $R^2$ ,  $R^3$  and  $R^4$  are -OH and  $R^9$  is -CH<sub>2</sub>- or -CH=;

(9) R<sup>1</sup> and R<sup>4</sup> independently are -OR<sup>PR</sup>, -SR<sup>PR</sup>, -N(R<sup>PR</sup>)<sub>2</sub>, an ester, a thioester, a phosphoester, a monosaccharide, an oligosaccharide, a carbonate or a carbamate, R<sup>2</sup> and R<sup>3</sup> are -H and R<sup>9</sup> is -CH<sub>2</sub>- or -CH=;

(10) R<sup>1</sup> and R<sup>4</sup> independently are -OR<sup>PR</sup>, -SR<sup>PR</sup>, -N(R<sup>PR</sup>)<sub>2</sub>, an ester, a thioester, a phosphoester, a monosaccharide, an oligosaccharide, a carbonate or a carbamate, R<sup>2</sup> is -H, R<sup>3</sup> is -Br and R<sup>9</sup> is -CH<sub>2</sub>- or -CH=;

(11) R<sup>1</sup> and R<sup>4</sup> independently are -OR<sup>PR</sup>, -SR<sup>PR</sup>, -N(R<sup>PR</sup>)<sub>2</sub>, an ester, a thioester, a phosphoester, a monosaccharide, an oligosaccharide, a carbonate or a carbamate, R<sup>2</sup> is -H, R<sup>3</sup> is -F and R<sup>9</sup> is -CH<sub>2</sub>- or -CH=;

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- (12) R<sup>1</sup> and R<sup>4</sup> independently are -OR<sup>PR</sup>, -SR<sup>PR</sup>, -N(R<sup>PR</sup>)<sub>2</sub>, an ester, a thioester, a phosphoester, a monosaccharide, an oligosaccharide, a carbonate or a carbamate, R<sup>2</sup> is -H, R<sup>3</sup> is -OH and R<sup>9</sup> is -CH<sub>2</sub>- or -CH=;
- (13) R<sup>1</sup> and R<sup>4</sup> independently are -OR<sup>PR</sup>, -SR<sup>PR</sup>, -N(R<sup>PR</sup>)<sub>2</sub>, an ester, a thioester, a phosphoester, a monosaccharide, an oligosaccharide, a carbonate or a carbamate, R<sup>2</sup> and R<sup>3</sup> are -OH and R<sup>9</sup> is -CH<sub>2</sub>- or -CH=;
- (14) R<sup>1</sup> and R<sup>4</sup> independently are -OR<sup>PR</sup>, -SR<sup>PR</sup>, -N(R<sup>PR</sup>)<sub>2</sub>, an ester, a thioester, a phosphoester, a monosaccharide, an oligosaccharide, a carbonate or a carbamate, R<sup>2</sup> is -OH, R<sup>3</sup> is -H, -F, -Cl or -Br and R<sup>9</sup> is -CH<sub>2</sub>-or -CH=;
- (15)  $R^1$  is -H,  $R^2$  is -OH or =O,  $R^3$  is -OH, -F, -Cl or -Br,  $R^4$  is -OR<sup>PR</sup>, -SR<sup>PR</sup>, -N( $R^{PR}$ )<sub>2</sub>, an ester, a thioester, a phosphoester, a monosaccharide, an oligosaccharide, a carbonate or a carbamate and  $R^9$  is -CH<sub>2</sub>- or -CH=;
- (16)  $R^1$  and  $R^2$  are -H,  $R^3$  is -OH or =O, -F, -Cl or -Br,  $R^4$  is -OR<sup>PR</sup>, -SR<sup>PR</sup>, -N(R<sup>PR</sup>)<sub>2</sub>, an ester, a thioester, a phosphoester, a monosaccharide, an oligosaccharide, a carbonate or a carbamate and  $R^9$  is -CH<sub>2</sub>- or -CH=;
- (17) R<sup>1</sup> is -OH, R<sup>2</sup> is -OH or =O, R<sup>3</sup> is -H, R<sup>4</sup> is -OR<sup>PR</sup>, -SR<sup>PR</sup>, -N(R<sup>PR</sup>)<sub>2</sub>, an ester, a thioester, a phosphoester, a monosaccharide, an oligosaccharide, a carbonate or a carbamate and R<sup>9</sup> is -CH<sub>2</sub>- or -CH=;
- (18) any of (1) through (17) above wherein  $R^9$  is -O- instead of -CH<sub>2</sub>- or -CH=; or
- (19) any of (1) through (17) above wherein  $R^9$  is -NH- instead of -CH<sub>2</sub>- or -CH=.
- 25 Claim 26 (new): The method of claim 25 wherein the compound has the structure

$$R^{1}$$
  $R^{1}$   $R^{2}$   $R^{4}$   $R^{3}$   $R^{4}$   $R^{3}$   $R^{4}$   $R^{2}$   $R^{3}$   $R^{4}$ 

Claim 27 (new): The method of claim 24 wherein the compound is 5  $3\alpha$ ,  $17\beta$ -dihydroxy-19-norandrost-4-ene,  $3\alpha$ ,  $17\beta$ -dihydroxy-19-norandrost-5-ene,  $3\alpha$ ,  $17\beta$ -dihydroxyandrost-4-ene,  $3\alpha$ ,  $17\beta$ -dihydroxyandrost-5-ene,  $3\alpha$ ,  $16\alpha$ ,  $17\beta$ trihydroxy-19-norandrost-4-ene,  $3\alpha$ ,  $16\alpha$ ,  $17\beta$ -trihydroxy-19-norandrost-5-ene,  $3\alpha$ ,  $16\alpha$ ,  $17\beta$ -trihydroxyandrost-4-ene,  $3\alpha$ ,  $16\alpha$ ,  $17\beta$ -trihydroxyandrost-5-ene,  $3\alpha$ ,  $16\beta$ ,  $17\beta$ -trihydroxy-19-norandrost-4-ene,  $3\alpha$ ,  $16\beta$ ,  $17\beta$ -trihydroxy-19-10 norandrost-5-ene,  $3\alpha$ ,  $16\beta$ ,  $17\beta$ -trihydroxyandrost-4-ene,  $3\alpha$ ,  $16\beta$ ,  $17\beta$ trihydroxyandrost-5-ene,  $3\alpha$ ,  $7\beta$ ,  $17\beta$ -trihydroxy-19-norandrost-4-ene,  $3\alpha$ ,  $7\beta$ ,  $17\beta$ trihydroxy-19-norandrost-5-ene,  $3\alpha$ ,  $7\beta$ ,  $17\beta$ -trihydroxyandrost-4-ene,  $3\alpha$ ,  $7\beta$ ,  $17\beta$ trihydroxyandrost-5-ene,  $3\alpha$ ,  $17\beta$ -dihydroxy- $16\alpha$ -fluoro-19-norandrost-4-ene,  $3\alpha$ , 17 $\beta$ -dihydroxy-16 $\alpha$ -fluoro-19-norandrost-5-ene,  $3\alpha$ , 17 $\beta$ -dihydroxy-16 $\alpha$ -15 fluoroandrost-4-ene,  $3\alpha$ ,  $17\beta$ -dihydroxy- $16\alpha$ -fluoroandrost-5-ene,  $3\alpha$ ,  $17\beta$ dihydroxy-16 $\beta$ -fluoro-19-norandrost-4-ene,  $3\alpha$ ,  $17\beta$ -dihydroxy-16 $\beta$ -fluoro-19norandrost-5-ene,  $3\alpha$ ,  $17\beta$ -dihydroxy- $16\beta$ -fluoroandrost-4-ene,  $3\alpha$ ,  $17\beta$ -dihydroxy-16β-fluoroandrost-5-ene,  $3\alpha$ ,  $17\beta$ -dihydroxy- $16\alpha$ -bromo-19-norandrost-4-ene,  $3\alpha$ ,  $17\beta$ -dihydroxy- $16\alpha$ -bromo-19-norandrost-5-ene,  $3\alpha$ ,  $17\beta$ -dihydroxy- $16\alpha$ -20 bromoandrost-4-ene or  $3\alpha$ ,  $17\beta$ -dihydroxy- $16\alpha$ -bromoandrost-5-ene,  $3\alpha$ ,  $17\beta$ -

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dihydroxy-16β-bromo-19-norandrost-4-ene,  $3\alpha$ ,17β-dihydroxy-16β-bromo-19-norandrost-5-ene,  $3\alpha$ ,17β-dihydroxy-16β-bromoandrost-4-ene or  $3\alpha$ ,17β-dihydroxy-16β-bromoandrost-5-ene.

Claim 28 (new): The method of claim 27 wherein the subject has osteoporosis and the compound is  $3\alpha,17\beta$ -dihydroxy-19-norandrost-4-ene.

Claim 29 (new): A compound having the structure

wherein,

R<sup>1</sup> is -OR<sup>PR</sup>, -SR<sup>PR</sup>, -N(R<sup>PR</sup>)<sub>2</sub>, -N<sub>3</sub>, an ester, a phosphoester, a phosphothioester, a sulfate ester, an amino acid, a peptide, an ether, a thioether, a carbonate, a carbamate, an optionally substituted monosaccharide or an optionally substituted oligosaccharide;

R<sup>2</sup> and R<sup>10</sup> independently are -H, -OR<sup>PR</sup>, -SR<sup>PR</sup>, -N(R<sup>PR</sup>)<sub>2</sub>, -N<sub>3</sub>, -CN, -NO<sub>2</sub>, an ester, a thioester, a phosphoester, a phosphothioester, a phosphonoester, a phosphiniester, a sulfite ester, a sulfate ester, an amide, an amino acid, a peptide, an ether, a thioether, an acyl group, a thioacyl group, a carbonate, a carbamate, a thioacetal, a halogen, an optionally substituted alkyl group, an optionally

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substituted alkynyl group, an optionally substituted aryl moiety, an optionally substituted heteroaryl moiety, an optionally substituted monosaccharide, an optionally substituted oligosaccharide, or,

R<sup>3</sup> is -OR<sup>PR</sup>, =O, -SR<sup>PR</sup>, =S, -N(R<sup>PR</sup>)<sub>2</sub>, -N<sub>3</sub>, -NO<sub>2</sub>, an ester, a phosphoester, a phosphothioester, a sulfate ester, an amino acid, a peptide, an ether, a thioether, a carbonate, a carbamate or a halogen;

R<sup>4</sup> is -OR<sup>PR</sup>, =O, -SR<sup>PR</sup>, =S, -N(R<sup>PR</sup>)<sub>2</sub>, -N<sub>3</sub>, =NOH, an ester, a phosphoester, a phosphothioester, a sulfate ester, an amino acid, a peptide, an ether, a thioether, a carbonate, a carbamate, an optionally substituted monosaccharide or an optionally substituted oligosaccharide;

R<sup>6</sup> is -H or optionally substituted alkyl;

R<sup>9</sup> is -CHR<sup>10</sup>-, -O-, -S-, -NR<sup>PR</sup>-, or R<sup>9</sup> is absent, leaving a 5-membered ring;

R<sup>13</sup> independently is C<sub>1-6</sub> alkyl;

R<sup>PR</sup> independently are -H or a protecting group.

Claim 30 (new): The compound of claim 29 wherein the compound is  $3\alpha,16\alpha,17\beta$ -trihydroxy-19-norandrost-4-ene,  $3\alpha,16\alpha,17\beta$ -trihydroxy-19-norandrost-5-ene,  $3\alpha,16\alpha,17\beta$ -trihydroxyandrost-4-ene,  $3\alpha,16\alpha,17\beta$ -trihydroxyandrost-5-ene,  $3\alpha,16\beta,17\beta$ -trihydroxy-19-norandrost-4-ene,  $3\alpha,16\beta,17\beta$ -trihydroxy-19-norandrost-5-ene,  $3\alpha,16\beta,17\beta$ -trihydroxyandrost-5-ene,  $3\alpha,7\beta,17\beta$ -trihydroxy-19-norandrost-5-ene,  $3\alpha,7\beta,17\beta$ -trihydroxy-19-norandrost-5-ene,  $3\alpha,7\beta,17\beta$ -trihydroxyandrost-5-ene,  $3\alpha,7\beta,17\beta$ -trihydroxyandrost-5-ene,  $3\alpha,17\beta$ -dihydroxy-16 $\alpha$ -fluoro-19-norandrost-4-ene,  $3\alpha,17\beta$ -dihydroxy-16 $\alpha$ -fluoro-19-norandrost-4-ene,  $3\alpha,17\beta$ -dihydroxy-16 $\alpha$ -fluoro-19-norandrost-5-ene,  $3\alpha,17\beta$ -dihydroxy-16 $\alpha$ -fluoro-19-norandrost-4-ene,  $3\alpha,17\beta$ -dihydroxy-16 $\alpha$ -fluoro-19-noran

16α-bromo-19-norandrost-5-ene,  $3\alpha$ ,17β-dihydroxy-16α-bromoandrost-4-ene or  $3\alpha$ ,17β-dihydroxy-16α-bromoandrost-5-ene,  $3\alpha$ ,17β-dihydroxy-16β-bromo-19-norandrost-4-ene,  $3\alpha$ ,17β-dihydroxy-16β-bromo-19-norandrost-5-ene,  $3\alpha$ ,17β-dihydroxy-16β-bromoandrost-4-ene or  $3\alpha$ ,17β-dihydroxy-16β-bromoandrost-5-ene.

Claim 31 (new): A pharmaceutical formulation comprising one or more excipients and  $3\alpha$ ,17 $\beta$ -dihydroxy-19-norandrost-5-ene or a compound of claim 29.

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